## IN THE CLAIMS

Claims 1-16 (Canceled).

17. (Original) A method of making an inverse spinel-structured Co ferrite on a substrate by oxygen plasma assisted molecular beam epitaxy, wherein at least 90% of the cobalt atoms occupy octahedral lattice positions of the Co ferrite during growth of the Co ferrite, comprising the step of supplying activated oxygen from an oxygen plasma source, an iron atom flux, and a cobalt atom flux to the surface of said substrate, wherein said iron and cobalt atom fluxes are individually controlled at said substrate by an atomic absorption spectroscopy detection system.

18. (Original) The method as recited in claim 17, wherein said substrate is MgO.

Claim 19 (Canceled).

20. (New) The method of claim 17, wherein said substrate is selected from the group consisting of SrO, MgO, BaO, $MgAl_2O_4$, $SrTiO_3$.

21. (New) The method of claim 17, which includes performing the growth at a temperature between 200° and 300° C.

22. (New) The method of claim 17, further comprising growing a spinal buffer layer on the substrate by molecular beam epitaxy before growing the binary ferrite.

23. (New) A method, comprising:

providing a substrate in a chamber;

selectively supplying activated oxygen, a cobalt atom flux, and an iron atom flux to the chamber;

performing molecular beam epitaxy to epitaxially grow an inverse spinel-structured ferrite on the substrate from the oxygen, the cobalt atom flux, and the iron atom flux; and

as the ferrite epitaxially grows during said performing, occupying octahedral lattice positions of the ferrite with cobalt to provide the ferrite in a substantially thermodynamically stable state absent post-growth annealing.

24. (New) The method of claim 23, wherein the substrate is selected from the group consisting of SrO, MgO, BaO, $MgAl_2O_4$, $SrTiO_3$.

25. (New) The method of claim 23, which includes maintaining a substrate temperature between 200° and 300° C during said performing.

26. (New) The method of claim 23, wherein at least 90% of the cobalt atoms occupy the octahedral lattice positions of the ferrite as the ferrite is grown during said performing.

27. (New) The method of claim 23, wherein said supplying includes individually controlling the cobalt atom flux and the iron atom flux with an atomic absorption spectroscopy detection system.

28. (New) The method of claim 23, wherein at least 90% of the cobalt atoms occupy the octahedral lattice positions of the ferrite as the ferrite is grown during said performing and said supplying includes individually controlling at least one of the cobalt atom flux and the iron atom flux with an atomic absorption spectroscopy detection system.

29. (New) A method, comprising:

providing a substrate in a chamber;

controllably supplying activated oxygen, a cobalt atom flux, and an iron atom flux to a surface of the substrate in the chamber, said supplying including individually controlling at least one of the cobalt atom flux and the iron atom flux with a spectroscopy detection system; and

during said supplying, epitaxially growing an inverse spinel-structured ferrite on the substrate with cobalt atoms occupying octahedral lattice positions of the ferrite during said growing to provide the ferrite in a substantially thermodynamically stable state.

30. (New) The method of claim 29, which includes controlling pressure in the chamber and temperature of the substrate.

31. (New) The method of claim 29, wherein the substrate is selected from the group consisting of SrO, MgO, BaO, $MgAl_2O_4$, $SrTiO_3$.

32. (New) The method of claim 29, which includes maintaining a substrate temperature between 200° and 300° C during said performing.

33. (New) The method of claim 29, wherein at least 90% of the cobalt atoms occupy the octahedral lattice positions of the ferrite as the ferrite is grown during said performing.

34. (New) The method of claim 29, wherein said individually controlling includes separately controlling both the cobalt atom flux and the iron atom flux.

35. (New) The method of claim 29, wherein the spectroscopy detection system is of an atomic absorption type.

36. (New) The method of claim 29, where said supplying includes providing the oxygen from an oxygen plasma source.